REMARKS

By this amendment, claim 10 has been amended and new claims 20-29 have been added in this application. Currently, claims 10-29 are pending in the application.

The indication that claims 12 and 16-19 contain allowable subject matter is noted with appreciation.

Claims 10-19 were rejected under 35 USC 112, second paragraph, as being indefinite. The Examiner stated that it was unclear how the width of the case is minimized by using the plurality of light emitting sections disposed along the longitudinal direction of the pipe. By this amendment, claim 10 has been amended to delete the phrase "whereby the width of said case can be minimized by using said plurality of light emitting sections disposed along the longitudinal direction of said pipe line". It is respectfully submitted that this rejection has been overcome by these amendments and it should be withdrawn.

Claim 10 was rejected under 35 USC 103(a) as being obvious over Conduit (EP 0099712) in view of Horikawa (JP 2002-267509). Claims 11 and 13-15 were rejected under 35 USC 103(a) as being obvious over Conduit in view of Horikawa and further in view of Koike (JP 08-271300).

These rejections are respectfully traversed in view of the amendments to independent claim 10 and the remarks below.

The present invention relates to a flow sensor for detecting the flow quantity of a fluid. The object of the present invention is to provide a flow sensor for enabling the user to easily check the detection state of the flow quantity in a detection section that can be miniaturized and made smaller and thinner (see page 1, lines 5-6 and page 3, lines 15-21).

In Fig. 4, the detection section 100 is provided by a casing member 21 and 22. The thickness t of the detection section 100 of the flow sensor in one direction of the detection section 100 is narrowed, as shown in Fig. 5A (see page 17, lines 16-20).

The detection section 100 includes a transmitter 111, a receiver 112, a high frequency signal oscillator 120, a high frequency signal amplifier 130, a phase comparator 140, a low frequency amplifier 150, a comparator 160, a frequency divider 170, a decoder 180, a signal level determination unit 190, and a flow indicator LU. This flow indicator LU includes light emission sections 81 to 84. The light emission section 81 has a red LED (light emitting diode) 81R and a green LED 81G. Each of the light emission sections 82 to 84 has a green LED (see page 9, line 21 - page 10, line 6).

The decoder 180, which is implemented as a shift register, decodes the output signal of the frequency divider 170, thereby turning on the light emission sections 81 to 84 of the flow indicator LU in green in order. In this case, the speed at which the light emission sections 81 to 84 of the flow indicator LU are turned on in order changes in response to the flow quantity (see page 11, lines 9-15).

For example, first the green LED 81G of the light emission section 81 goes on in green as shown in FIG. 8A; next, the light emission section 81 goes off and the light emission section 82 goes on in green as shown in FIG. 8B; subsequently the light emission section 82 goes off and the light emission section 83 goes on in green as shown in FIG. 8C; and further the light emission section 83 goes off and the light emission section 84 goes on in green as shown in FIG. 8D. This operation is repeated in the order of FIG. 8A to FIG. 8D (see page 20, line 15 - page 21, line 3).

The light emission sections 81 to 84 may produce level display of the detected flow quantity rather than going on in green in order. Specifically, as many light emission sections as the number responsive to the flow quantity are turned on (see page 22, lines 3-7).

By this amendment, independent claim 10 has been amended to recite "a flow indicator having a plurality of light emission sections disposed on one of said faces of said case and turning on at least one of said plurality of light emission sections, so as to indicate the flow quantity of the fluid by at least one of a speed of cycling light through said plurality of light emission sections and the number of said plurality of light emission sections emitting light".

These features are not shown or suggested by Conduit, Horikawa, Koike or any combination of these references.

Conduit relates to flowmeters comprising a body, an inlet, an annular member, a circular valve member, a spring, a plunger and an indicator means (see page 1, lines 1-13).

Conduit discloses that the module 40 has leads 43 from a 12V/24V D.C. power supply (not shown) and is connected to a liquid crystal display (LCD) 44 having a four-digit display capable of registering from 0 to 1999 relative to the rate of flow through the flowmeter (see page 9, lines 16-21).

Conduit also discloses that a button switch 46 enables the display 44 to be switched from the rate of flow to temperature for as long as the button is depressed (see page 9, line 25 - page 10, line 2).

Conduit also discloses that in Figs. 6 and 7, an analogue display 44' is shown in place of the digital display 44 in the integral display unit 41 and in the remote display unit RD, respectively (see page 10, lines 22-25).

Applicants respectfully submit that Conduit cannot have a thin width in the direction perpendicular to the pipe as shown in the present invention. Conduit discloses a 7-segment display and a needle display. In order to read the numbers with a good visibility, it is necessary to make the displayed numbers larger, and thus, the case cannot be made thinner. Therefore, with the 7-segment display of Conduit, a case cannot be made which has a good visibility and a thin width. Further, regarding the needle display, the size of the display depends on the radius of the needle and the visibility depends on the width so it is difficult to make this dimension smaller.

Conduit does not disclose a flow indicator having a plurality of light emission sections disposed on one of the faces of the case and turning on at least one of the plurality of light emission sections, so as to indicate the flow quantity of the fluid by at least one of a speed of cycling light through the plurality of light emission sections and the number of the plurality of light emission sections emitting light as claimed in independent claim 10.

For these reasons, it is believed that Conduit does not show or suggest the present claimed features of the present invention. Applicants also submit that Horikawa does not make up for the deficiencies in Conduit.

Horikawa relates to a flowmeter equipped with a display. More specifically, the display displays the detected flow rate by the flowmeter (see paragraph [0001]).

Horikawa discloses that the flowmeter has a body case 101 and a display case and the body case and the display case are attached each other by an attachment section 103. A display case 102 has a rectangular solid shape (see paragraph [0014]).

Horikawa also discloses that the display case 102 has a direction display 106 which displays the flow direction of a detected fluid, and a numeric display 107, which displays the flow rate of a detected fluid as shown in Figs. 2(a) and 2(b) (see paragraph [0018]).

Horikawa also discloses that the flowmeter of Fig. 4 shows the modification of the flowmeter 1 as mentioned above. This flowmeter 1 is the same configuration as described above except the direction display 106 is in one side face of the display case 102 as shown in Fig. 4 (see paragraph [0044]).

Applicants respectfully submit that the integrated-type sensor of Horikawa is different from the separate-type sensor of

the present invention. Horikawa, as shown in Figs. 1 and 7, is based on the integrated-type sensor in which the setting portion, etc. is provided. Therefore, Horikawa does not disclose or suggest making a width of the head thinner. Further, Horikawa discloses a technique directed to a direction display, which displays the flow direction of the fluid to be detected. However, as shown in Figs. 1 and 7, the display of Horikawa is based on the display having both a numerical value display portion (107), which displays the flow quantity of the fluid to be detected with the numerical values, and a direction display portion (106), which displays the flow direction of the fluid to be detected. The drawings of Horikawa simply emphasize the direction display, and thus, Horikawa does not disclose or suggest deleting the numerical value display portion.

Horikawa also does not disclose a flow indicator having a plurality of light emission sections disposed on one of the faces of the case and turning on at least one of the plurality of light emission sections, so as to indicate the flow quantity of the fluid by at least one of a speed of cycling light through the plurality of light emission sections and the number of the plurality of light emission sections emitting light as claimed in independent claim 10.

For these reasons, it is believed that Horikawa does not show or suggest the present claimed features of the present invention. Applicants also submit that Koike does not make up for the deficiencies in Conduit and Horikawa.

Koike relates to a vortex flowmeter accurately detecting the Karman's vortex from a low flow rate to a high flow rate (see abstract).

Koike discloses that a vortex flowmeter 11 has a housing 12 and a flow rate instruction section 13 which is constructed on the housing 12. The flow rate instruction section 13 has a display 13a on the front face as shown in Fig. 1 (see paragraph [0016]).

Koike does not disclose does not disclose a flow indicator having a plurality of light emission sections disposed on one of the faces of the case and turning on at least one of the plurality of light emission sections, so as to indicate the flow quantity of the fluid by at least one of a speed of cycling light through the plurality of light emission sections and the number of the plurality of light emission sections emitting light as claimed in independent claim 10.

It is therefore respectfully submitted that Conduit, Horikawa and Koike, individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would

not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

New independent claim 20 has been added in the application. New independent claim 20 recites "a flow indicator having a plurality of light emission sections disposed on one of said faces of said case and turning on at least one of said plurality of light emission sections by at least one of a decoder and a signal level determination unit, so as to indicate the flow quantity of the fluid by at least one of a speed of cycling light through said plurality of light emission sections and the number of said plurality of light emission sections emitting light". These claimed features are not shown or suggested by Conduit, Horikawa, Koike or any combination of these references. Allowance of this claim is also respectfully requested.

New dependent claims 21-29, which directly or indirectly depend from independent claim 20, have been added in the application. Applicants respectfully submit that these claims recite additional features and also define over the prior art of record. Allowance of these claims is also respectfully requested.

In view of foregoing claim amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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